Table S1. Activation energy at different conversion rates.

α	Without catalysts						With catalysts					
	FOW		Kissinger		Friedman		FOW		Kissinger		Friedman	
	E(kJ/mol)	R^2	E(kJ/mol)	R^2	E(kJ/mol)	R^2	E(kJ/mol)	R^2	E(kJ/mol)	R^2	E(kJ/mol)	R^2
0.3	139.410	0.9882	116.898	0.9822	171.215	0.9370	89.466	0.9787	77.337	0.9694	104.598	0.99694
0.4	151.391	0.9772	128.776	0.9662	154.796	0.8501	99.947	0.9869	87.801	0.9818	89.064	0.99994
0.5	154.722	0.9577	131.655	0.9375	145.605	0.8698	100.671	0.9936	88.049	0.9911	79.803	0.99809
0.6	156.345	0.9460	132.757	0.9202	127.829	0.7409	98.532	0.9956	85.323	0.9939	77.441	0.98586
0.7	153.175	0.9229	128.785	0.8850	128.598	0.8398	96.434	0.9946	82.625	0.9923	106.754	0.96933
0.8	152.615	0.9162	127.504	0.8738	121.623	0.9864	104.054	0.9879	90.0489	0.9828	119.951	0.9383
Average	151.276		127.729		141.611		98.1839		85.197		96.269	

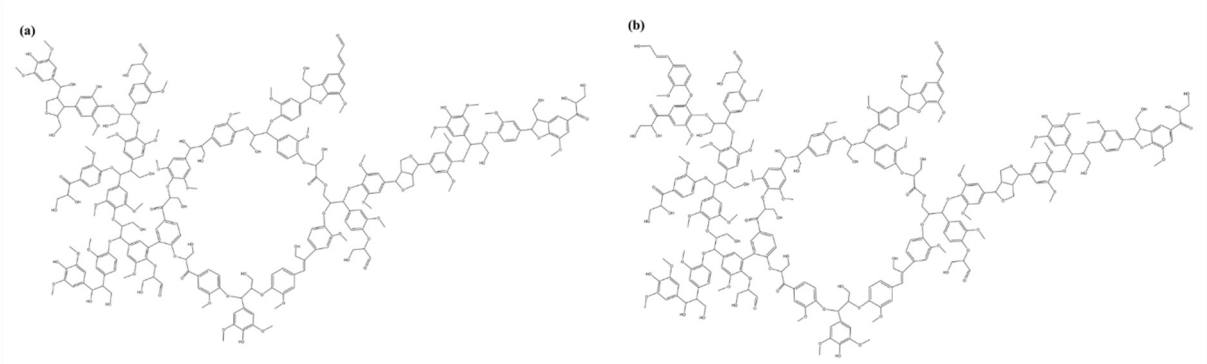

Figure S1. The detailed 2D model structures of Nimz's lignin model. The constructed 3D model consists of 5 molecules of (a) and 2molecules of (b).

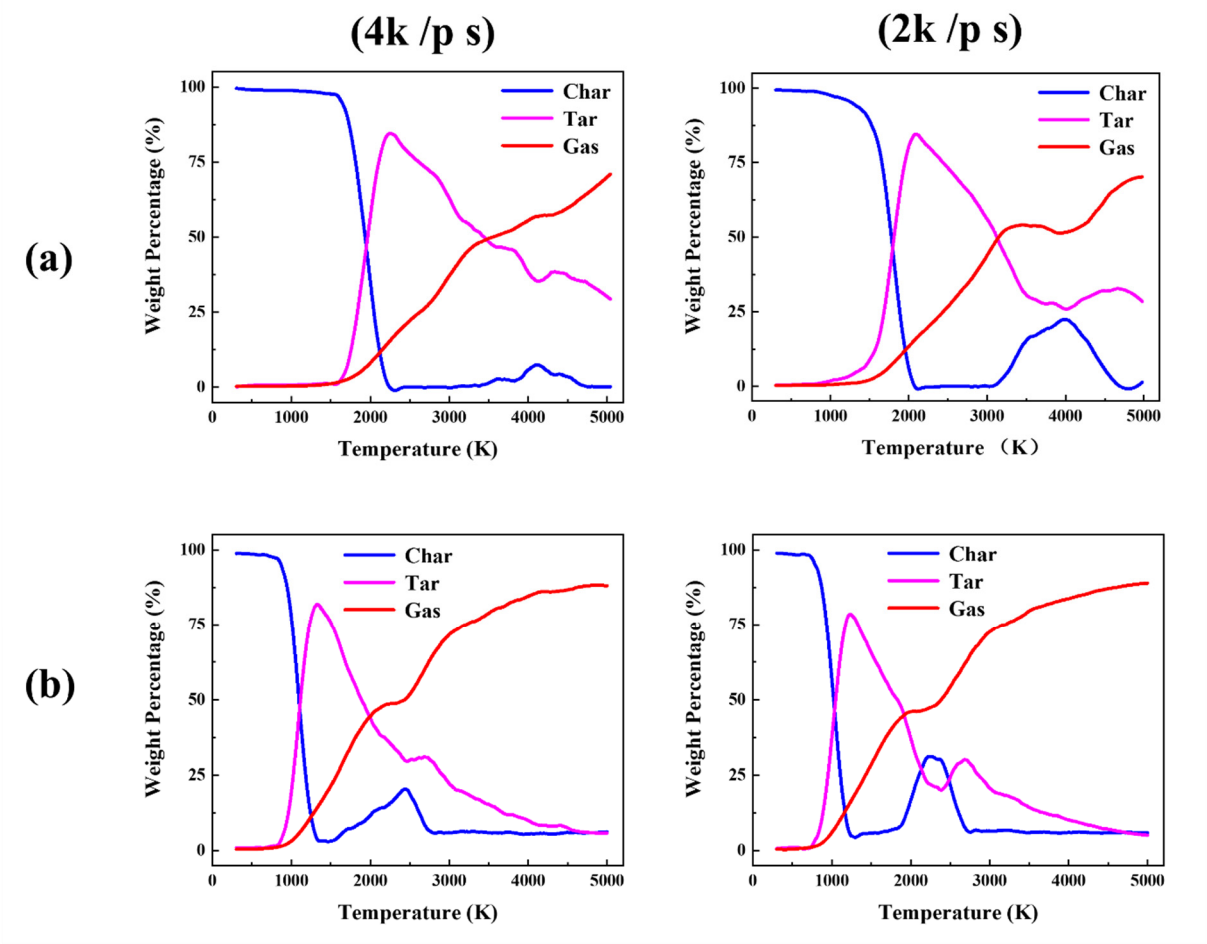

Figure S2. Char, Tar and Gas content changes at 4K/ps,2K/ps: (a) without catalysts, (b) with Pt catalysts.

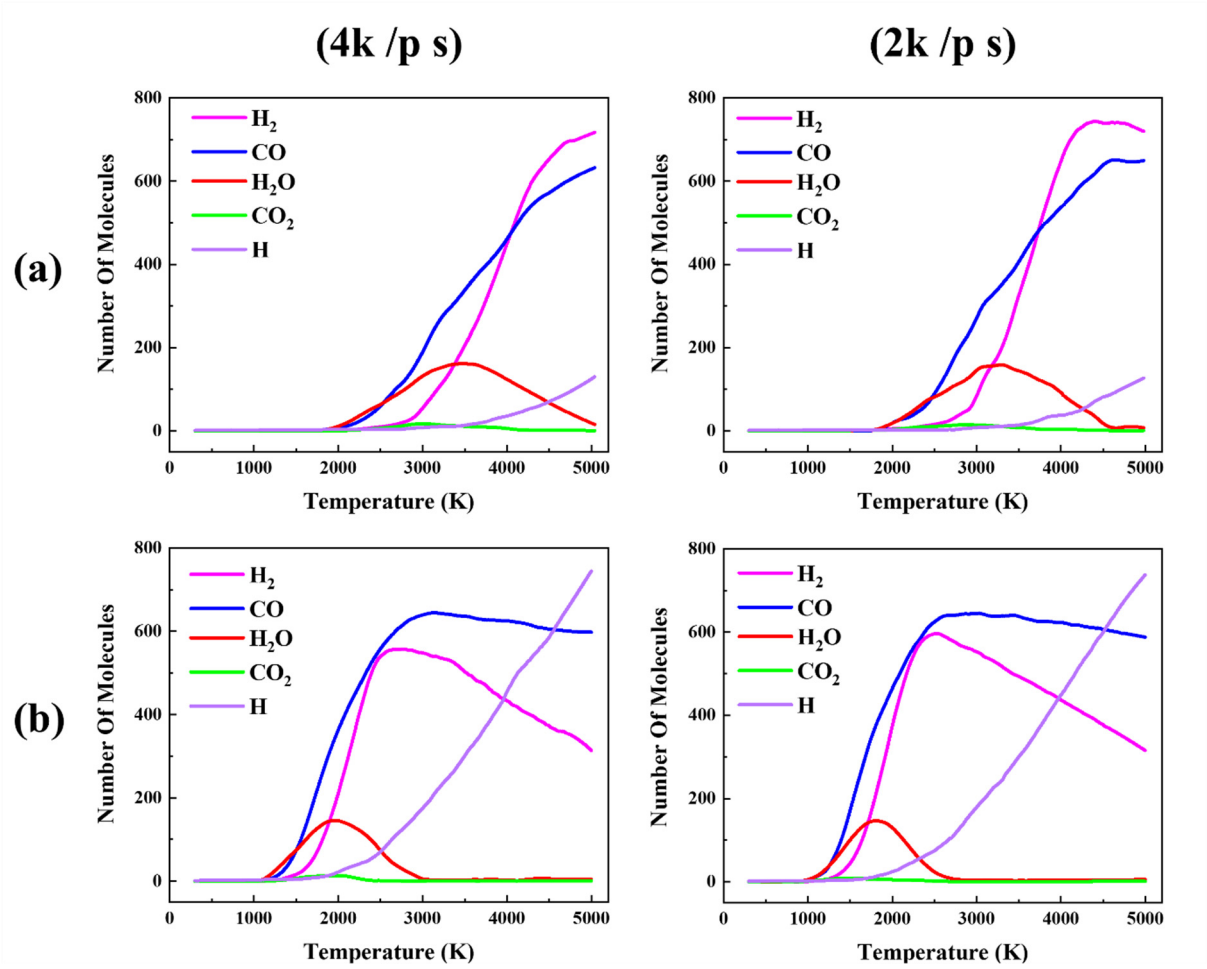

Figure S3. The number of molecules at 4K/ps,2K/ps: (a) without catalysts, (b) with Pt catalysts.

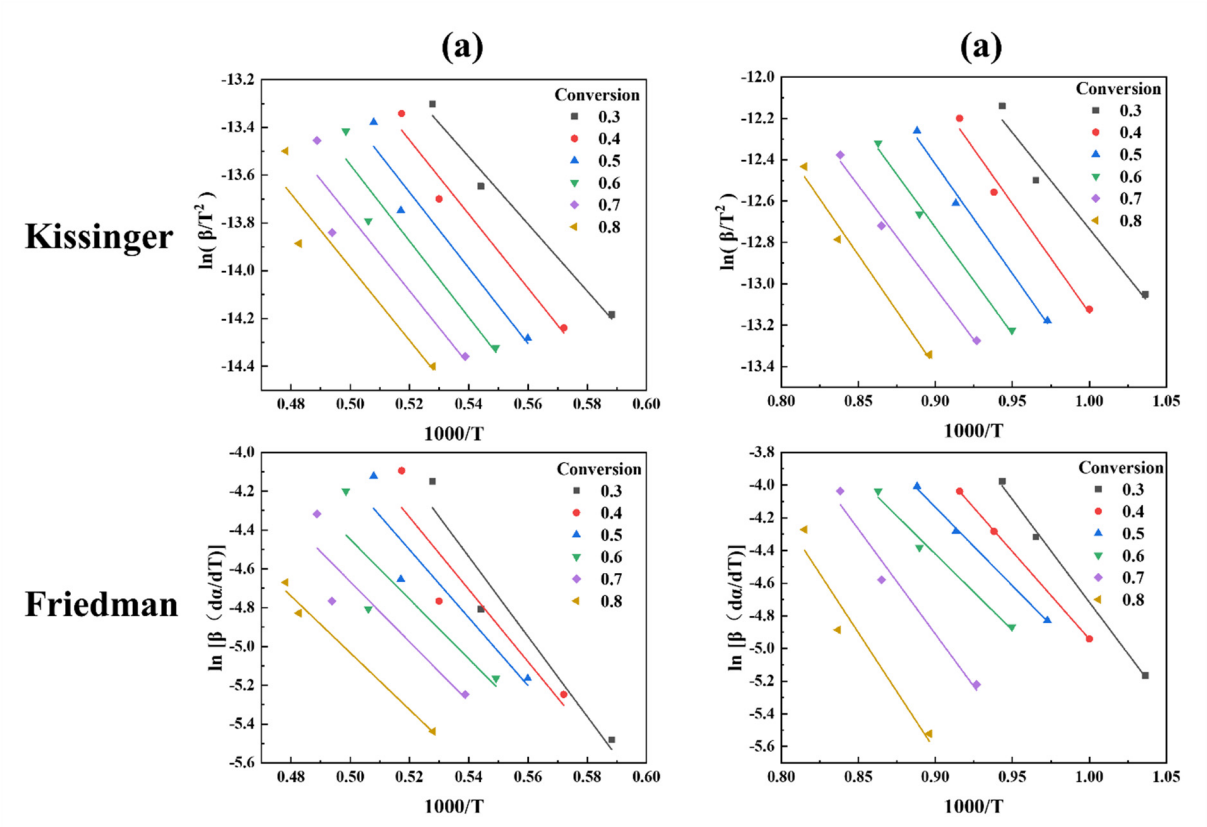

Figure S4. The Kissinger and Friedman methods fit activation energies at 4K/ps and 2K/ps: (a) without catalysts, (b) with Pt catalysts.